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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/590,744	05/17/2007	Marco Friedrich	5367-256PUS	1203

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EXAMINER

PATEL, ISHWARBHAI B

ART UNIT	PAPER NUMBER
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2835

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10/25/2011

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/590,744	FRIEDRICH ET AL.	
	Examiner	Art Unit	
	ISHWARBHAI PATEL	2835	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on May 23, 2011.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 1-5,7-9 and 11-32 is/are pending in the application.
- 5a) Of the above claim(s) 26-31 is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 1-5,7-9 and 11-25 is/are rejected.
- 8) ☒ Claim(s) 32 is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☒ The drawing(s) filed on 07 October 2010 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. Pursuant to further review and the pre-appeals conference, though the arguments are not persuasive, it has been decided to reopen the prosecution to place the rejection in better form. Accordingly, the finality of the action is withdrawn. New rejection is formulated as follow:

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 3, 4, 7-8, 11, 15, 16, 19 and 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuan (US Patent No.6, 860,620).

Regarding claim 1, Kuan, generally in figures 3-4, discloses a light emitting diode arrangement, comprising a flexible circuit board (103) comprising electrical conductor tracks (121, 123, 124 and 126) and a thermally conductive layer (heat sink track 122, 125) and at least one high power light emitting diode (102) mounted onto said flexible circuit board and in thermal contact with the thermally conductive layer (see partial figure 5), wherein the thermally conductive layer and the electrical conductor tracks are positioned in a same plane of the flexible circuit board (see figure).

Kuan does not explicitly disclose the thermally conductive layer occupies at least 60 % of an area of said same plane. However, Kuan further recites that the substrate may also include a heat sink metal frame (108) arranged on the substrate in contact with the thermally conductive layer (conductive layer forming heat sink track 112, 125, column 4, line 1-8, column 3, line 50-55). This implies that increasing the area of heat conductive layer will facilitate better heat removal rate.

Therefore, it would have been obvious to a person having ordinary skill in the art at the time of applicant's invention to provide the board of Kuan with the thermally conductive layer occupying at least 60 % of an area of said same plane, in order to have better heat removal rate.

Further, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or working ranges involves only routine skill in the art. *In re Aller*, 105 220 F.2d 454,456, 105 USPQ 233, 235 (CCPA 1955).

Regarding claim 3, the modified structure of Kuan further discloses the high power light emitting diode is soldered onto the flexible circuit board (column 4, line 40-50).

Regarding claim 4, the modified structure of Kuan further discloses the flexible circuit board contains at least one flexible carrier layer (103).

Regarding claim 7, the modified structure of Kuan further discloses the thermally conductive layer contains a metal (column 3, line 42-49).

Regarding claim 8, the modified structure of Kuan further discloses the thermally conductive layer contains copper (column 3, line 42-49).

Regarding claim 11, the modified structure of Kuan further discloses the thermally conductive layer and the electrical conductor tracks contain the same metal (column 3, line 42-49).

Regarding claim 15, the modified structure of Kuan further discloses side of the flexible circuit board which is remote from the high power light emitting diode has an adhesive-containing layer (104).

Regarding claim 16, the modified structure of Kuan further discloses the adhesive-containing layer is formed by a double sided adhesive tape (as it is bonded on both sides, with 103 and 105).

Regarding claim 19, the modified structure of Kuan further discloses the adhesive-containing layer is covered with a protective film (105).

Regarding claims 21-25, the modified structure of Kuan further discloses a multiplicity of high power light emitting diodes are provided, which diodes are connected in series (claim 21); a pair of contact areas is provided for each high power light emitting diode (claim 22); has sections, each section having a high power light emitting diode and the associated pair of contact areas (claim 23); the sections are arranged as repeating structures (claim 24) and the sections are arranged in a series (claim 25), as disclosed in figure 1-5.

4. Claims 2, 9, 12-14, 17-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuan (US Patent No. 6,860,620) as applied to claim 1 above.

Regarding claim 2, Kuan discloses all the features of the claimed invention as applied to claim 1, including the high power light emitting diode but does not explicitly disclose the diode with a power consumption of at least 300 mW.

However, diode with 300 mW power is known and the diode will be selected to have desired light intensity in the system.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the diode having a power consumption of at least 300 mW, in order to have desired light intensity in the system.

Regarding claim 9, Kuan discloses all the features of the claimed invention as applied to claim 1, including the at least one high power light emitting diode and the thermally conductive layer but does not disclose the high power light emitting diode is soldered onto the thermally conductive layer. Kuan discloses the using a thermally conductive glue.

However, soldering the diode to the thermally conductive layer is old and known in the art to have better structural connection.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the high power light emitting diode soldered onto the thermally conductive layer, in order to have better structural connection.

Regarding claims 17 and 18, Kuan discloses all the features of the claimed invention as applied to claim 1, including the adhesive-containing layer but does not disclose the adhesive-containing layer is heat-resistant up to temperatures of 250.degree. C. and the adhesive-containing layer has a thickness of at most 60 μm .

However, the adhesive layer is connected to thermally conductive layer and also transmit the heat. Therefore should be able to withstand the heat generated as well thin enough to transmit the heat as fast as possible.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the adhesive-containing layer having heat-resistant up to temperatures of 250.degree. C. and the

Art Unit: 2835

adhesive-containing layer having a thickness of at most 60 μm , to withstand the temperature without damage and to transmit the heat as fast as possible.

Regarding claim 20, Kuan discloses all the features of the claimed invention as applied to claim 1, including the protective film but does not disclose the protective film contains a plastic. However, depending upon use, if the system is to be used on another fixture which it self is going to work as a heat sink, the heat sink may not be attached to the arrangement but a plastic removable sheet is attached, which is known in the art.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the protective film contains a plastic, in order to facilitate the storage of the arrangement before actual use.

Regarding claims 12-14, Kuan discloses all the features of the claimed invention as applied to claim 1, including the flexible circuit board but does not disclose an insulating layer is applied to one of the surfaces of the flexible circuit board (claim 12); the insulating layer has cutouts for making electrical and thermal contact with the high power light emitting diode (claim 13) and the insulating layer contains a soldering resist (claim 14).

However, providing solder mask on the board is old and known in the art to protect the surface from environmental damage.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the insulating layer containing a solder mask as recited in claims 12-14, in order to protect the surface from environmental damage.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuan as applied to claim 4 above, and further in view of Becker (US Patent No. 7,273,987).

Regarding claim 5, Kuan discloses all the features of the claimed invention as applied to claim 1, including the flexible carrier layer but does not disclose the layer contains at least one of the following materials: polyimide, polyethylene naphthalate, polyester, FR4. Kuan discloses synthetic material such as polyamide (column 3, line 15-20).

Becker discloses light emitting diode arrangement and recite the flexible substrate made of polyimide (column 4, line 46-67).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of applicant's invention to provide the arrangement of Kuan with the flexible substrate made of polyimide.

Further, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin* 227 F.2d 197, 125 USPQ 416 (CCPA 1960)).

Allowable Subject Matter

6. Claim 32 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. The following is a statement of reasons for the indication of allowable subject matter:

Regarding claim 32, a light emitting diode arrangement, comprising a flexible circuit board with the limitation “the thermally conductive layer has an essentially round form” in combination with other claimed limitation of base claim 1 has not been disclosed by prior art of record taken alone or in combination.

Response to Arguments

8. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ISHWARBHAI PATEL whose telephone number is (571)272-1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy J. Thompson can be reached on (571) 272 2342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2835

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ishwarbhai B Patel/
Primary Examiner, Art Unit 2835
October 17, 2011